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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,788	11/09/2001	Donald R. Desota	BEA920010032US1	5857

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EXAMINER
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SONG, JASMINE

ART UNIT	PAPER NUMBER
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2188

DATE MAILED: 03/25/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/010,788

Applicant(s)

DESOTA ET AL.

Examiner

Jasmine Song

Art Unit

2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **Detailed Action**

1. Claims 1-20 are represented for examination.

### **Specification**

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### **Drawings**

3. The drawings filed on 11/09/2001 have been approved by the Examiner.

### **Oath/Declaration**

4. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R. 1.63.

### **Information Disclosure Statement**

5. The information disclosure statement (IDS) submitted on 11/09/2001 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### **Claim Rejections - 35 USC § 102**

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 6-7, 10-11, 13-14, 17 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by McIntosh-Smith., U.S. Patent 6,324,632 B1.

Regarding claim 1, McIntosh-Smith teaches that a method comprising:  
determining a location of a line of memory (such as a first memory space, a second memory space and a third memory space in the main memory; col.2, lines 30-35) to be cached in a cache partitioned into a plurality of cache sections (cache partitions CP1 to CP4; col.2, lines 29-30 and lines 35-41); determining a section for the line of memory as one of the plurality of cache sections (Fig.1 and Fig.2, col.2, lines 57-63), based on the location of the line of memory as applied against a memory line location dependent cache allocation policy (Fig.4, vector max/min algorithm for memory and cache allocation; or Fig.6, a random number generator algorithm for memory and cache allocation); storing the line of memory in the section determined (Fig.1 or 2).

Regarding claim 11, McIntosh-Smith teaches that a system comprising: a cache for caching lines of a plurality of lines of memory including a line to be cached (Fig.2); a

plurality of cache sections into which the cache is partitioned (Fig.1, CP1 to CP4); an allocation policy (Fig.4, vector max/min algorithm for memory and cache allocation; or Fig.6, a random number generator algorithm for memory and cache allocation) specifying which of the plurality of lines of memory are allocated to which of the plurality of cache sections based on locations of the plurality of lines of memory (col.6, lines 15-17 and lines 60-64); and a mechanism (Fig.10, the decision circuit 52) to determine a section of the plurality of cache sections for the line to be cached based on a location of the line as applied against the allocation policy (col.10, lines 65-67), and to store the line in the section determined (Fig.1 or 2).

Regarding claim 17, McIntosh-Smith teaches that an article comprising: a computer-readable medium (col.1, lines 15-17); means in the medium for determining a section of a plurality of cache sections (Fig.1 and Fig.2, col.2, lines 57-63) into which a cache has been partitioned (cache partitions CP1 to CP4; col.2, lines 29-30 and lines 35-41) to store a line of memory (such as a first memory space, a second memory space and a third memory space in the main memory; col.2, lines 30-35) to be cached based on a location of the line of memory as applied against a memory line location-dependent cache allocation policy (Fig.4, vector max/min algorithm for memory and cache allocation; or Fig.6, a random number generator algorithm for memory and cache allocation); and for storing the line of memory in the section determined (Fig.1 or 2).

Regarding claim 6, McIntosh-Smith teaches that determining the location of the line of memory to be cached comprises examining an address of the line of memory (it is taught as the incoming data stream is to be stored in a first memory space which to be cached in the first cache partition).

Regarding claim 7, McIntosh-Smith teaches that determining the section for the line of memory comprises determining the section of the plurality of cache sections to which the location of the line of memory is allocated (col.6, lines 15-17 and lines 60-64, col.10, lines 65-67) according to the memory line location-dependent cache allocation policy (Fig.4, vector max/min algorithm for memory and cache allocation; or Fig.6, a random number generator algorithm for memory and cache allocation).

Regarding claim 10, McIntosh-Smith teaches that further initially comprising receiving the line of memory to be cached (col.2, lines 10-24).

Regarding claim 13, McIntosh-Smith teaches that a size of each of the plurality of cache sections is static (Fig.1, cp1 to cp4).

Regarding claim 14, McIntosh-Smith teaches that the allocation policy is static (Fig.4, vector max/min algorithm and random number generator algorithm).

Regarding claim 15, McIntosh-Smith teaches that the medium is a recordable data storage medium (Fig.1).

### **Claim Rejections - 35 USC § 103**

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 2-5,8-9,12,15-16 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over McIntosh-Smith., U.S. Patent 6,324,632 B1., in view of Douglas US Patent 5,537,635.

Regarding claims 2, McIntosh-Smith teaches the claimed invention (independent claims 1, 11 and 17) as shown above,

McIntosh-Smith does not specifically teach further comprising dynamically adjusting a size of each of the plurality of cache sections, he only teaches that a cache memory divided into a plurality of cache partitions (Fig.1).

However, Douglas teaches dynamically adjusting a size of each of the plurality of cache sections (col.2, lines 2-4 and lines 36-42).

As taught by Douglas, dynamically adjusting a size of each of the plurality of cache sections has the advantages of allowing the resources of the cache to be fully utilized (col.2, lines 51-53) and avoiding the cache full conditions to be occurred when little used cache partitions become active (col.2, lines 58-63). It would have been

obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Douglas in the system of McIntosh-Smith and utilize the teachings of dynamically adjusting a size of each of the plurality of cache sections for the advantages stated above.

Accordingly, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

Regarding claim 3, Douglas teaches that dynamically adjusting the size of each of the plurality of cache sections comprises dynamically adjusting the size of each of the plurality of cache sections based on one or more of: utilization of each of the plurality of cache sections (col.2, lines 40-41); and, fullness of each of the plurality of cache sections (col.2, lines 58-60).

Regarding claim 4, Douglas teaches further comprising dynamically adjusting the memory line location-dependent cache allocation policy (it is taught as setting reclaim vectors used to establish a steal policy in a partition cache utilizing dynamic resource allocation).

Regarding claim 5, Douglas teaches dynamically adjusting the memory line location dependent cache allocation policy comprises dynamically adjusting the memory



line location-dependent cache allocation policy based on one or more of: temporal locality of memory line locations allocated to each of the plurality of cache sections; and, reutilization of memory line locations allocated to each of the plurality of cache sections (col.4, lines 16-27).

Regarding claim 8, Douglas teaches storing the line of memory in the section determined comprises: in response to determining that the section is full, selecting a replacement line of memory in the section; replacing the replacement line of memory with the line of memory in the section (it is well know in the cache replacement algorithms); otherwise, adding the line of memory to the section (adding the cache line based on the LRU; col.1, lines 51-60).

Regarding claim 9, Douglas teaches further initially comprising: setting a size of each of the plurality of cache sections; and, setting the memory line location-dependent cache allocation policy (col.3, lines 65-67).

Regarding claim 12, Douglas teaches wherein the plurality of cache sections comprises a first cache section and a second cache section (Fig.1), the first cache section larger in size than the second cache section, the allocation policy specifying that the first cache section stores highly temporally local lines of memory and the second cache section stores lowly temporally local lines of memory (col.1, lines 61 to col.2, lines 13).

Regarding claim 15, Douglas teaches a size of each of the plurality of cache sections is dynamic, the mechanism periodically adjusting the size of each of the plurality of cache sections (col.2, lines 2-4 and lines 36-42).

Regarding claim 16, Douglas teaches the allocation policy is dynamic, the mechanism periodically adjusting the allocation policy (it is taught as setting reclaim vectors used to establish a steal policy in a partition cache utilizing dynamic resource allocation).

Regarding claim 18, Douglas teaches the means is further for adjusting dynamically a size of each of the plurality of cache sections based at least on one or more of: utilization of each of the plurality of cache sections (col.2, lines 40-41); and, fullness of each of the plurality of cache sections (col.2, lines 58-60).

Regarding claim 19, Douglas teaches the means is further for dynamically adjusting the memory line location-dependent cache allocation policy based at least on one or more of: temporal locality of memory line locations allocated to each of the plurality of cache sections; and, reutilization of memory line locations allocated to each of the plurality of cache sections (col.4, lines 16-27).

### **Conclusion**

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kuwata	US 6347358 B1
Sturges et al	US 6594729 B1
Arimilli et al	US 6425058 B1
Smith	US 5394531
Aglietti et al	US 6381676 B2
Yanai et al	US 6035375
Sturges et al	US 6453385 B1
Root et al	US 6681295 B1
Dwyer et al	US 2003/0070046 A1

11. When responding to the office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections. See 37 C.F.R. 1.111 (c).

12. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

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13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jasmine Song whose telephone number is 703-305-7701. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 703-306-2903. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Jasmine Song



Patent Examiner

March 8, 2004

Mano Padmanabhan  
3/19/04

Mano Padmanabhan

Supervisory Patent Examiner

Technology Center 2100